PROGRAMMED LOADING OF DISPENSER WITH SUPPLY OF DISPENSABLE OBJECTS

Technical Field

Mechanically loading objects for dispensing so as to retain information about the loaded objects.

Background

Loading of various objects accurately into a dispensable array so as to retain loading information presents problems that have not been satisfactorily solved by the many dispensers that have been proposed. Generally, these suffer from expense, size, and weight; the need for complex electromechanical devices; the need to adapt to information storing and transmitting technologies; and limitations on the variety of objects that can be dispensed.

Some dispensing devices have required loading of objects into columns so that all the objects in a single column are the same and the objects are dispensed from the bottoms of the columns. This limits the variety of objects available to the number of columns and precludes dispensing objects from any location within a matrix array.

Other solutions have used carousels or juke box type mechanisms, which are electromechanically complex and expensive. Drawer and locker dispensers have also been proposed, and some of these use machine readable information to identify loaded objects so that dispensing equipment can locate and dispense the identified objects.

All these suggestions are limited in the object packing density and variety they can achieve, are generally cumbersome and expensive, and create and manage object-loading information only at considerable additional expense. Such systems are also vulnerable to human error in loading objects incorrectly to create mismatches with the loading information. The result has left many businesses with unfulfilled needs for the dispensing of small objects in an efficient and low cost way.

Summary of the Invention

This invention proposes a dispensable object loading and information generating system applied to a variety of objects dispensed from an array. The invention seeks to reduce loading errors and to generate and preserve accurate information on the objects loaded in the array. Such information is valuable for the object loading operation and is also needed for the object dispensing.

The invention applies to a dispenser holding an array of dispensable objects with latchable and unlatchable retainers. Unlatching mechanisms for the retainers are actuated via microcircuitry in the dispenser that receives and retains loading information. A reload controller connects to the microcircuitry during the loading process and is able to unlatch the latch mechanisms via the microcircuitry.

The reload controller is programmed to determine the number of each of a variety of objects to be loaded into an array for dispensing. The reload controller uses its microcircuitry connection to the retainer latches to direct a human performing the reloading while producing loading information usable later in the dispensing operation.

The reload controller has an interface accessible to a person desiring to reload the dispenser. The reload controller can prompt the person with programmed suggestions for objects to be loaded, and the person can input to the reload controller intentions to load specific objects.

The person first latches any unlatched retainers in the dispensing array and then instructs the reload controller or complies with a prompt from the reload controller to load a predetermined number of one of the variety of objects to be dispensed. The reload controller then unlatches retainers for positions available in the array for loading the selected objects. The unlatched retainers allow access to locations within the array where the objects can be loaded, and they also provide visual clues to a person doing the reloading of where the objects are to be placed. The person loads those objects into the unlatched locations, with very little chance of error, and latches the retainers to hold the loaded objects in place. The person then acknowledges to the reload controller the completion of the loading of the selected objects and moves on to the next selected objects. The acknowledgment actuates the reload controller to communicate to the microcircuitry in the dispenser the locations, identity, and number of the loaded objects. When the loading procedure is completed, the dispensing array is loaded as fully as desired; and the microcircuitry in the dispenser is informed of all the locations and types of objects loaded. Any of these can then be dispensed from any location within the array.

Commonly assigned U.S. Application No. 10/215,239, filed on August 8, 2002, and U.S. Application No. 10/254,296, filed on September 25, 2002, both of which are incorporated by reference

herein, combine with the invention of this application to form an improved system.

Drawings

Figures 1-4 are partially schematic views of a dispenser connected to a reload controller at various stages of a dispenser reloading process showing: a mostly empty dispenser ready for reloading in FIG. 1; the dispenser of FIG. 1 with relatched retainers in FIG. 2; the dispenser of FIG. 2 with unlatched retainers giving a visual indication and access to reloadable spaces in FIG. 3; and the dispenser of FIG. 3 reloaded with objects held by relatched retainers in FIG. 4.

Figure 5 is a schematic flow diagram of the preferred steps involved in reloading the dispenser of FIGS. 1-4.

Detailed Description

Reloading and dispensing according to the invention is accomplished via portable cases 20 having carrying handles 21 and made light enough to carry back and forth between a loading site and a dispensing site. This has several advantages including ensuring that reloading is done in a controlled environment in an efficient way, compared with the usual need for a serviceman to visit a dispensing site to reload a dispensing machine. The incorporated information from U.S. Application No. 10/215,239, filed on August 8, 2002, entitled "Information Management Of Supply Flow Of Dispensed Objects", provides a specific implementation of the preferred portable dispenser system.

Portable case 20 also includes microcircuitry 40 containing a memory record of what has been loaded and dispensed, and this

memory travels with case 20 so that the information is available at both the dispensing and loading sites. The microcircuitry 40 can be arranged in any convenient spot within case 20, and is schematically shown in the drawings as lying in a plane behind an array 30 of object holding locations 31 and corresponding latchable and unlatchable object retainers 25. The incorporated information from U.S. Application No. 10/254,296, filed on September 25, 2002, entitled "Object Dispenser", provides a specific implementation of such retainers.

Microcircuitry 40 communicates electrically with retainers 25 and can be activated to unlatch any retainer 25. In an unlatched position as shown for all but three of the retainers in Figure 1, retainers 25 allow objects 10 to enter into locations 31 or exit from locations 31. Retainers 25 are manually latchable to the latched position shown for all the retainers 25 in Figure 2, where they block objects from going into or out of array locations 31.

Reload controller 50 is preferably a microcontroller deployed at a reloading site by being electrically connected to portable case 20 to communicate with microcircuitry 40, as shown by the double-headed broken lines in Figures 1-4. In a connected condition, reload controller 50 can receive information from case 20 on undispensed objects, and on the dispensing of objects from a previous load. Reload controller 50 can thereby establish what, if anything, remains within case 20 and where any remaining objects are located in case 20.

Controller 50 is also involved in the reloading of case 20 and is preferably programmed to determine a desired loading of objects into case 20 for return to a dispensing site. Past experience on what objects have been needed at the dispensing site can be used in programming controller 50 so that a reloaded container 20 will contain

the objects that are desired in the numbers that are expected to be needed at the dispensing site.

Reload controller 50 preferably includes a display 51, a keypad 52, and a usable connection (not shown) to a computer. Display 51 and keypad 52 offer an interface with a person reloading case 20 so that display 51 can convey information, and keypad 52 can receive information. Many variations are possible in the configuration and programming of a suitable reload controller 50.

The case 20 that is illustrated, for example, in Figure 1 is nearly empty and contains only three objects 10a, which are indicated by hatched lines at three of the array locations 31. The three objects 10a are all that remain from a case full of objects that were dispensed before the case returned to the loading site. Connecting controller 50 to case 20 delivers information to controller 50 on the identity of the undispensed or remaining objects 10a and the location of these objects within case 20. The reloading process, for purposes of illustration then assumes that the three objects 10a remaining in case 20 are suitable for return to the dispensing site with a fresh load of additional objects. Alternatively, the three undispensed objects 10a could be removed from case 20 and replaced with other reloaded objects for return to a dispensing site.

A person wishing to reload case 20 then manually latches retainers 25 so that they all block array locations 31, as illustrated in Figure 2. Having all the retainers 25 in closed and latched positions is then visually apparent to the reloading person, and any retainer that is missed and left unlatched becomes conspicuous so that it can be latched, and container 20 can have the uniform appearance shown in Figure 2.

By preprogramming of reload controller 50, preferably based on information about previous needs at a dispensing site, or by interaction with a person loading case 20, reload controller 50 preferably prompts the reloading person via display 51 to reload certain numbers of certain objects 10b into array 30. The person doing the reloading then acts upon the prompt or upon an input to controller 50 acknowledging the prompt and undertaking to reload the proposed objects into case 20. By having its prompt acknowledged, controller 50 responds by unlatching the required number of retainers 25 at suitable locations in array 30 to receive objects 10b for reloading. As illustrated in Figure 3, four retainers are unlatched for this purpose and the unlatched retainers are each identified as 25b. The person then loads objects 10b into the array spaces 31 that are made available by unlatching of retainers 25b and relatches those retainers to hold objects 10b in place, as illustrated in Figure 4.

Since retainers 25 are readily visible to the person reloading case 20, and since the difference between a latched and unlatched retainer 25 is visually apparent, the person doing the reloading is in effect instructed by controller 50 on where to put each type of object to be loaded. Since only one type of object is loaded at a time, the unlatching of retainers 25b to indicate where each type of object should be loaded helps eliminate errors in loading. The reload controller 50, by indicating array locations 31 that are available for objects then directs the person to put the objects in the correct locations where their whereabouts is known by controller 50.

After the person has loaded the desired number of one variety of objects 10b and has relatched retainers 25 so that reloaded objects are held in place in array 30, then the person doing the reloading

acknowledges to controller 50 that the desired reloading step was achieved. Reload controller 50 then transmits to microcircuitry 40 the location and type of each of the reloaded objects 10b. This information remains in case 20 and travels with case 20 to a dispensing site.

The reloading process then proceeds in the sequence described above for the next type of object to be reloaded. Again, acting on a prompt from controller 50, or on input by the reloading person, controller 50 unlatches some additional retainers 25. These are visibly noticeable to the reloading person who then places the objects in the array locations 31 that are indicated by the unlatched retainers. The person then relatches retainers 25 and confirms to controller 50 that the selected objects have been loaded. The number of times the reloading sequence is repeated depends on the number of varieties of objects to be loaded, and continues until case 20 is fully loaded for return to a dispensing site. Information on the loading of the objects goes with the case to the dispensing site, and the interaction between controller 50, case 20, and a reloading person practically assures that the loading is all done accurately with no mismatch between the intended load and the actual load.

Reload controller 50 can also be programmed to distribute objects within array 30 with regard to their weight or mass. For example, reload controller 50 can be programmed to direct heavier objects to be loaded in lower regions of array 30 near a bottom of case 20 opposite carrying handle 21. This can help keep case 20 stable and avoid becoming top heavy. The loading of objects into case 20, as is apparent from the illustrations, can otherwise be practically random.

The flow chart of Figure 5 illustrates the above-described steps in the object reloading process, beginning with connecting reload controller 50 with a case to be reloaded. For transport between a loading site and a dispensing site, each case 20 preferably has a cover or door enclosing the objects within, and although such a door is not illustrated, it can be provided with a lock limiting access to the case and adding to the security of the object flow. A person wishing to reload a case 20 necessarily removes or opens the cover or door to gain access to the object array 30.

All unlatched retainers mated with locations 31 from which objects have been dispensed are then relatched as previously explained. A reload request entered into controller 50 can be in response to a prompt by controller 50 that is acknowledged by the person doing the reloading, and in most situations this is preferred. The reloading person preferably also has the capacity to initiate reloading requests that are not preprogrammed into controller 50. Either way, controller 50 responds by unlatching retainers in locations 31 suitable for receiving objects 10b to be reloaded. The person then reloads objects 10b and relatches the retainers to hold the reloaded objects 10b. This returns case 20 to the state of having all its retainers 25 latched, and this prepares the way for a subsequent loading request to reload other objects into case 20. The sequence then repeats until case 20 is fully loaded and ready for return to a dispensing site. In this condition, information on all the objects loaded into case 20 and the location of those objects in case 20 is stored in microcircuitry 40 and travels with case 20 to the dispensing site.